REMARKS

Claims 1-19 are pending. Claims 15-19 have been withdrawn from consideration by the Examiner for being drawn to a non-elected invention. By this Amendment, Claims 1 and 8 are amended. As support for the amendments is provided in the originally filed written disclosure and drawing figures, such, as for example only, Figure 3, Applicants respectfully submit no new matter is presented.

Election/Restriction

Applicants respectfully affirm the election to prosecute the invention of Group I (i.e., Claims 1-14), with traverse, made by Mr. George Oram during a telephone conversation on December 27, 2004.

Claims 1-2, 5-9 and 12-14 Recite Patentable Subject Matter

Claim 1 is rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,634,168 to Yamamoto. Claim 8 is rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,175,107 to Iwaoka et al. (hereinafter "Iwaoka"). Claims 1-7 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,874,051 to Heil et al. (hereinafter "Heil") in view of Yamamoto and U.S. Patent No. 4,774,217 to Takeuchi et al. (hereinafter "Takeuchi") Claims 8-14 are rejected under 35 U.S.C. §103(a) as being unpatentable over Heil in view of Iwaoka and U.S. Patent No. 5,376,610 to Takahata et al. (hereinafter "Takahata"). Applicants respectfully traverse all of the rejections.

Claims 1 and 8 each recite a device for carbon monoxide removal by selective oxidation including, among other features, a temperature controlling unit, an air introduction unit, and a gas mixing unit are provided between carbon monoxide

selective oxidation catalyst layers, wherein a reformed gas discharged from the temperature controlling unit is introduced into the air introduction unit, the reformed gas being discharged from the air introduction unit into the gas mixing unit, and the reformed gas discharged from the gas mixing unit being introduced into the carbon monoxide selective oxidation catalyst layers as a flow direction of the gas is from an upstream side to a downstream side of the carbon monoxide selective oxidation catalyst layers, and wherein a cooling medium flows in a direction crossing the flow direction of the gas in the carbon monoxide selective oxidation catalyst.

Applicants respectfully submit that Yamamoto, Iwaoka, Heil, Takeuchi, and Takahata, alone or in combination, fail to disclose or suggest such features.

Yamamoto discloses an exhaust gas purification system including at least one first upstream catalyst (10) including at least one selected from platinum, palladium and rhodium; and at least one second downstream catalyst (12) including platinum in an amount greater than that of the platinum of the upstream catalyst.

However, Yamamoto does not disclose or suggest a temperature controlling unit, an air introduction unit, and a gas mixing unit being provided between carbon monoxide selective oxidation catalyst layers, wherein a reformed gas discharged from the temperature controlling unit is introduced into the air introduction unit, the reformed gas being discharged from the air introduction unit into the gas mixing unit, and the reformed gas discharged from the gas mixing unit being introduced into the carbon monoxide selective oxidation catalyst layers as a flow direction of the gas is from an upstream side to a downstream side of the carbon monoxide selective oxidation catalyst layers, and

wherein a cooling medium flows in a direction crossing the flow direction of the gas in the carbon monoxide selective oxidation catalyst.

Iwaoka discloses different embodiments of a catalytic exhaust gas purifying device in Figures 3, 5, and 7-13.

However, none of the embodiments of the catalytic exhaust gas purifying device described by Iwaoka disclose or suggest a temperature controlling unit, an air introduction unit, and a gas mixing unit being provided between carbon monoxide selective oxidation catalyst layers, wherein a reformed gas discharged from the temperature controlling unit is introduced into the air introduction unit, the reformed gas being discharged from the air introduction unit into the gas mixing unit, and the reformed gas discharged from the gas mixing unit being introduced into the carbon monoxide selective oxidation catalyst layers as a flow direction of the gas is from an upstream side to a downstream side of the carbon monoxide selective oxidation catalyst layers, and wherein a cooling medium flows in a direction crossing the flow direction of the gas in the carbon monoxide selective oxidation catalyst.

Heil discloses a CO-oxidation reactor (1) with three oxidation stages (I, II, and III). Each stage (I, II, and III) includes a common reaction chamber (2) having a cooling chamber (6) with at least one static mixing chamber (8) and at least one metal catalyst support unit (5) provided therein. As shown in Figure 1, the cooling medium in Heil flows into the cooling chamber (6) disposed outside the reaction chamber in a direction parallel (i.e., not crossing) to the direction of the flow of the gas. The CO oxidation reactor shown in Figure 2 includes plate-shaped reactor modules (P_1 to P_n) and cooling areas (W_1 to W_{n-1}) that are alternately arranged. The gas flows through the first reactor

module from top to bottom, spans a cooling area, and then flows from the bottom to the top in the next reactor module. As such, the gas flows as follows: horizontally, downward, horizontally, upward, horizontally, downward, and so on. The cooling medium flows in each cooling area (W1 to W_{n-1}) from top to bottom.

Heil does not disclose or suggest a temperature controlling unit, an air introduction unit, and a gas mixing unit being provided between carbon monoxide selective oxidation catalyst layers, wherein a reformed gas discharged from the temperature controlling unit is introduced into the air introduction unit, the reformed gas being discharged from the air introduction unit into the gas mixing unit, and the reformed gas discharged from the gas mixing unit being introduced into the carbon monoxide selective oxidation catalyst layers as a flow direction of the gas is from an upstream side to a downstream side of the carbon monoxide selective oxidation catalyst layers, and wherein a cooling medium flows in a direction crossing the flow direction of the gas in the carbon monoxide selective oxidation catalyst.

Takeuchi merely teaches providing a higher catalyst density on a downstream side than an upstream side and does not teach providing a reactor between serially connected carbon monoxide selective oxidation catalyst layers.

Takeuchi does not disclose or suggest a temperature controlling unit, an air introduction unit, and a gas mixing unit being provided between carbon monoxide selective oxidation catalyst layers, wherein a reformed gas discharged from the temperature controlling unit is introduced into the air introduction unit, the reformed gas being discharged from the air introduction unit into the gas mixing unit, and the reformed gas discharged from the gas mixing unit being introduced into the carbon monoxide

selective oxidation catalyst layers as a flow direction of the gas is from an upstream side to a downstream side of the carbon monoxide selective oxidation catalyst layers, and wherein a cooling medium flows in a direction crossing the flow direction of the gas in the carbon monoxide selective oxidation catalyst.

Takahata merely teaches providing an upstream catalyst layer with a shorter length relative to the entire catalyst length to control temperature in the upstream catalyst layer and maintain catalyst activity level downstream.

Takahata does not disclose or suggest a temperature controlling unit, an air introduction unit, and a gas mixing unit being provided between carbon monoxide selective oxidation catalyst layers, wherein a reformed gas discharged from the temperature controlling unit is introduced into the air introduction unit, the reformed gas being discharged from the air introduction unit into the gas mixing unit, and the reformed gas discharged from the gas mixing unit being introduced into the carbon monoxide selective oxidation catalyst layers as a flow direction of the gas is from an upstream side to a downstream side of the carbon monoxide selective oxidation catalyst layers, and wherein a cooling medium flows in a direction crossing the flow direction of the gas in the carbon monoxide selective oxidation catalyst.

As stated above, none of the applied art of record, i.e., Yamamoto, Iwaoka, Heil, Takeuchi, and Takahata, alone or in combination, teaches or suggests a temperature controlling unit, an air introduction unit, and a gas mixing unit being provided between carbon monoxide selective oxidation catalyst layers, wherein a reformed gas discharged from the temperature controlling unit is introduced into the air introduction unit, the reformed gas being discharged from the air introduction unit into the gas mixing unit,

and the reformed gas discharged from the gas mixing unit being introduced into the carbon monoxide selective oxidation catalyst layers as a flow direction of the gas is from an upstream side to a downstream side of the carbon monoxide selective oxidation catalyst layers, and wherein a cooling medium flows in a direction crossing the flow direction of the gas in the carbon monoxide selective oxidation catalyst.

Moreover, Applicants respectfully submit that one of ordinary skill in the art would not find it obvious to combine the teachings of Yamamoto, Iwaoka, Takeuchi, and Takahata with Heil since they are directed to a purification catalyst cell for exhaust gas and not a catalyst for selective oxidation removal of CO.

In the case of purifying exhaust gas, combustible HC is combusted at earlier stages, and less combustible HC remains at later stages of purification. As such, different stages have different particular components of the exhaust gas that are to be combusted. In the purification of exhaust gas, for the purpose of combusting less combustible HC, the particular type of catalyst is changed and the amount of catalyst is increased and/or the length of the catalyst layer is modified, for example.

On the other hand, CO selective oxidation removal is directed to selectively removing CO, and the particular component of the exhaust gas to be removed is CO, at all of the stages. Accordingly, the amount of the catalyst had not been changed in conventional techniques. Under such circumstances, the Applicants identified problems regarding reduced efficiency of selective removal of CO, and repeated experiments led to the concept of multi-stage removal: preventing generation of excessive heat at earlier stages, and effectively removing CO at later stages.

To qualify as prior art under 35 U.S.C. §102, a single reference must teach, i.e., identically describe, each feature of a rejected claim. As explained above, Yamamoto, Iwaoka, Heil, Takeuchi, and Takahata fail to teach or suggest each and every feature recited by Claims 1 and 8. Therefore, Yamamoto, Iwaoka, Heil, Takeuchi, and Takahata do not anticipate or render obvious the invention recited by Claims 1 and 8.

Further, to establish *prima facie* obviousness, each feature of a rejected claim must be taught or suggested by the applied art of record. See M.P.E.P. §2143.03. As explained above, Yamamoto, Iwaoka, Heil, Takeuchi, and Takahata, alone or in combination, fail to teach or suggest each and every feature recited by Claims 1 and 8. Therefore, Applicants respectfully submit Claims 1 and 8 are not rendered obvious by the teachings of Yamamoto, Iwaoka, Heil, Takeuchi, and Takahata.

Accordingly, Applicants respectfully submit Claims 1 and 8 should be deemed allowable over Yamamoto, Iwaoka, Heil, Takeuchi, and Takahata for the reasons discussed above.

Claims 2 and 5-7 depend from Claim 1. Claims 9 and 12-14 depend from Claim 8. It is respectfully submitted that these dependent claims should be deemed allowable for the same reasons Claims 1 and 8 are allowable, as well as for the additional subject matter recited therein.

As such, Applicants respectfully request withdrawal of all of the rejections.

Conclusion

In view of the foregoing, reconsideration of the application, withdrawal of the outstanding rejections, allowance of the Claims 1-14, and the prompt issuance of a Notice of Allowability are respectfully solicited.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing docket number 107439-00063**.

Respectfully submitted,
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Enclosure: Petition for Extension of Time